



IB MYP YEAR 5
ASSESSMENT TASK
A Broad-based Test

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|----------------------|-----------------------------------|---|
| Subject: <i>Math</i> | Y9 <i>Standard</i> Mathematics | Name : <i>Marrin Li</i> (Class) <i>Y9 Trust (14)</i> |
| Assessment: | Broad-based Test | |
| Date of assessment: | 8 th June, 2012 | |

- This task assesses Criteria A and C;
- Time allowed – *1 hour and 30 mins*;
- You must answer all the questions;
- Write your answers in the spaces provided;
- Show all of your working – not just the answer
- Scientific Calculator is allowed.

| Criterion A | | |
|-------------|--|---|
| Levels | Task-Specific Rubric | Official IB Descriptors |
| 0 | The student does not reach a standard described by any of the descriptors given below. | |
| 1-2 | Students are reasonably successful with the Part A questions only. Any errors here are relatively minor. | The student generally makes appropriate deductions when solving simple problems in familiar contexts. |
| 3-4 | Students are successful with Part A questions. The only errors in part B questions are minor. | The student generally makes appropriate deductions when solving more complex problems in familiar contexts. |
| 5-6 | Students are successful with Part A and B questions. The only errors in part C questions are minor. | The student generally makes appropriate deductions when solving challenging problems in a variety of familiar contexts. |
| 7-8 | Students are successful with Part A, B and C questions. The only errors in part D questions are minor. | The student consistently makes appropriate deductions when solving challenging problems in a variety of contexts including unfamiliar situations. |

| Criterion C | | |
|-------------|---|---|
| Levels | Task-Specific Rubric | Official IB Descriptors |
| 0 | The student does not reach a standard described by any of the descriptors given below. | |
| 1-2 | Very little working is shown, and/or the steps shown are confusing. Only the most basic mathematical symbols are used with accuracy. | The student shows basic use of mathematical language and/or forms of mathematical representation. The lines of reasoning are difficult to follow . |
| 3-4 | The working shown is generally adequate. Only a few errors in symbols/terminology are evident. It is reasonably easy to follow a student's logic/reasoning. | The student shows sufficient use of mathematical language and forms of mathematical representation. The lines of reasoning are clear though not always logical or complete . The student moves between different forms of representation with some success . |
| 5-6 | There are very few, if any, errors in symbols/terminology. All steps in calculations are shown in their completeness. It is easy to follow all the student's logic/reasoning. | The student shows good use of mathematical language and forms of mathematical representation. The lines of reasoning are concise, logical and complete . The student moves effectively between different forms of representation. |

Part A (Level 1-2 Questions)

1. Factorize the following

a. $x^2 - 16x$

$$\begin{aligned} x^2 - 4x^2 \\ = (x+4x)(x-4x) \\ = (5x)(-3x) \\ = -15x \end{aligned}$$

Answer

(a)

$-15x$

b. $x^2 - 16$

$$\begin{aligned} x^2 - 4^2 \\ = (x-4)(x+4) \end{aligned}$$

Answer

(b)

$(x-4)(x+4)$

c. $x^2 + 3x - 28$

Answer

(c)

$(x-4)(x+7)$

2. Consider a set of data 11cm, 15cm, 19cm, 8cm, 9cm, 12cm, 13cm, 15cm, 17cm and 12cm.

8, 9, 11, 12, 12, 13, 15, 15, 17, 19

a. Find the mean of this set of data.

Answer

(a)

13.1

b. Find the median of this set of data.

Answer

(b)

12.5

c. Find the mode of this set of data.

Answer

(c)

$12, 15$

Part B (Level 3-4 Questions)

3. In Ivan's family, there are 8 members, including Ivan himself, his father, mother, grandmother, 2 elder brothers, 1 elder sister and 1 younger sister. If a person is chosen at random, find the probabilities of the following events happening.

a. Ivan's elder brother is chosen.

Answer (a) $\frac{1}{4}$

b. A male is chosen.

Answer (b) $\frac{1}{2}$

4.

- a. Show that $\cos^2 x - \sin^2 x = 2\cos^2 x - 1$

$$\cos^2 x - (2\cos^2 x - 1) = \sin^2 x$$

$$\cos^2 x - 1 = \sin^2 x$$

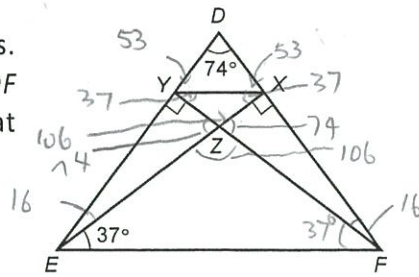
Answer (a) $\cos^2 x - 1 = \sin^2 x$

- b. If $\cos \theta = \frac{1}{5}$, find the value of $\cos^2 x - \sin^2 x$

Answer (b) -1

Part C (Level 5-6 Questions)

5. In the figure, DYE and DXF are straight lines. EX and FY are the altitudes of $\triangle DEF$ on DF and DE respectively, and they intersect at Z . $\angle EDF = 74^\circ$ and $\angle XEF = 37^\circ$.



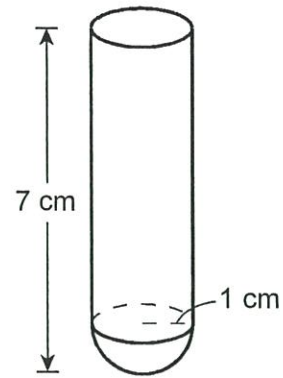
- a. Prove that $\triangle DEF$ and $\triangle ZEF$ are isosceles triangles.

$\angle DYX$ and $\angle DXY = 53^\circ$ (\angle sum of \triangle)
 $\angle XYZ$ and $\angle YXZ = 37^\circ$ (adj \angle on st. line.)
 $\angle YZX = 106^\circ$ (\angle sum of \triangle)
 $\angle EZF = 106^\circ$ (opp. \angle)
 $\angle YZE$ and $\angle XZF = 74^\circ$ (adj \angle of st. line)
 $\angle ZFE = 37^\circ$ (\angle sum of \triangle)
 $\angle YFX$ and $\angle YFX = 16^\circ$ (\angle sum of \triangle)
 $\therefore 37 + 37 + 106 = \angle ZEF = 180^\circ$ $\triangle ZEF$ is isosceles.
 $\therefore 37 + 37 + 16 + 16 + 74 = \angle DEF = 180^\circ$ $\triangle DEF$ is isosceles.

- b. Prove that $EF \parallel YX$.

$\angle XYF$ and $\angle XFY$ is 37° (exterior)
 $\angle XEF$ and $\angle XFY$ is 37°
 $\therefore EF \parallel YX$

6. The figure shows a solid composed of a right cylinder and a hemisphere. The height of the solid is 7 cm and the base radius of the cylinder is 1 cm.



- a. Find the volume of the solid.

(Express your answers in terms of π .)

$$\pi 1^2 \times 7 + \left(\frac{4}{3} \times \pi 1^3 \right) \div 2$$

$$= 7\pi + 2\pi$$

$$= 9\pi \text{ cm}^3$$

Answer

(a)

$$9\pi \text{ cm}^3$$

- b. Find the total surface area of the solid.

(Express your answers in terms of π .)

$$(2\pi 1 \times 7) + 2\pi 1^2 + (4\pi 1^2) \div 2$$

$$= 14\pi + 2\pi + 2\pi$$

$$= 18\pi \text{ cm}^2$$

Answer

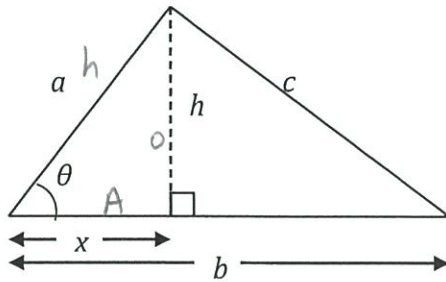
(b)

$$18\pi \text{ cm}^2$$

Part D (Level 7-8 Questions)

7. Given a triangle:

$$\begin{aligned}\cos &= \frac{A}{h} \\ \sin &= \frac{O}{h} \\ \tan &= \frac{O}{A}\end{aligned}$$



For questions a – d, write equations that:

a. relates: a , h , and x

$$x^2 + h^2 = a^2$$

Answer

(a)

$$x^2 + h^2 = a^2$$

b. relates: x , a and θ

$$\cos \theta = \frac{x}{a}$$

Answer

(b)

$$\cos \theta = \frac{x}{a}$$

c. expresses c^2 in terms of x , b and h

$$(b-x)^2 + h^2 = c^2$$

Answer

(c)

$$(b-x)^2 + h^2 = c^2$$

d. Using equations above, show that $c^2 = a^2 + b^2 - 2ab \cos \theta$

$$c^2 = a^2 + b^2 - 2ab \times \frac{x}{a}$$

8. Given the points A(2,R), B ^{x_2, y_2} (1,1) and C ^{x_1, y_1} (4,3)
- a. Find the distance between B and C

$$\frac{y_1 - y_2}{x_1 - x_2}$$

$$= \frac{3-1}{4-1}$$

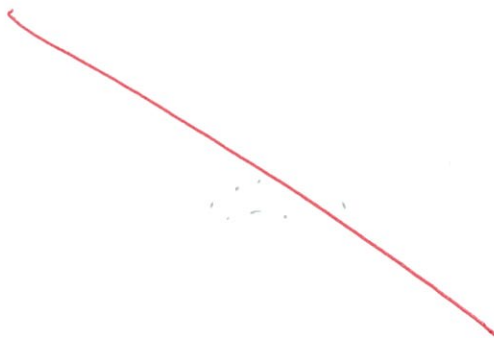
$$= \frac{2}{3}$$

Answer

(a)

$$\frac{2}{3}$$

- b. Find the equation of the line passing through B and C



Answer

(b)

$$\sqrt{13}$$

- c. If the line AC is \perp to BC, find the value of R

Answer

(c)

$$6$$

- d. Find the $\angle ABC$

Answer

(d)

$$57.1^\circ$$

--The End of Paper---